Pre-emptive productivity adjustments

A report for Jemena, AusNet Services, SA Power Networks, CitiPower, Powercor Australia and United Energy

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Executive Summary

For each regulatory control period, the Australian Energy Regulator (AER) determines the allowed level of operating expenditure (opex) for a distribution network service provider (DNSP) as part of the regulatory determination of its total allowed revenue. The AER approaches this by projecting opex in each year of the regulatory control period after adjustment for an annual rate of change to account for the effect of expected changes in output, real prices and productivity. The productivity component of this rate of change represents the opex productivity growth that a DNSP is expected to achieve throughout the regulatory period, pre-emptive of an actual change in productivity.

It is within this context that we have been asked by Victorian and South Australian DNSPs, ie, Jemena, AusNet Services (AusNet), SA Power Networks, CitiPower, Powercor Australia (Powercor) and United Energy, to advise on the conceptual and empirical basis for the application of this pre-emptive productivity adjustment to a DNSP's opex, having regard to the operation of the regulatory framework and the AER's approach to administering that framework.

Improvements in opex productivity are realised when the quantum of the outputs that a DNSP produces (measured by an index of energy throughput, system capacity, customer numbers and reliability) increases relative to the value of the DNSP's opex program.

We identify that observed historical opex productivity gains have often necessitated additional capital expenditure (capex). Since the opex analyses relied upon by the AER do not reflect the capex required to achieve opex productivity gains, having regard only to achieved opex productivity growth risks overstating productivity gains (or, alternatively, understating any decline in productivity gains), since there is likely to be an amount of capex offsetting that observed change. We conclude that the AER's forecast of productivity growth must reflect the *net effect* of opex productivity enhancing activities, ie, after accounting for all expenditure – both capital and operating in nature – required to achieve those gains.

This consideration also points to a pre-emptive productivity adjustment being set at the lower end of the expected productivity growth outcomes, to mitigate the risk that a DNSP does not have a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

When productivity enhancements are driven by innovation, they represent an expansion of the productivity frontier, ie, the maximum level of efficiency achievable by a DNSP. However, observed changes in opex productivity achieved by any particular DNSP may reflect either a movement from a less efficient level towards the frontier, ie, 'catch-up', and/or a concurrent movement that expands the productivity frontier, 'frontier shift'.

A number of DNSPs were operating below their efficiency potential over the 2006 to 2016 period. Since the pre-emptive productivity growth should only reflect the expected frontier shift, having regard to the productivity changes achieved by these DNSPs will exacerbate the risk of conflating 'catch-up' and 'frontier shift' and will overstate the expansion of the productivity frontier. To reduce this risk, we conclude the productivity growth should be forecast by reference to a subset of DNSPs taken to be operating efficiently over the evaluation period, since these DNSPs are more likely to be representative of the expansion of the frontier.

The innovation that drives the frontier shift is inherently difficult to forecast due to the diverse range of drivers, and exhibits year-on-year volatility as to its nature and scale. Regard should be had to observed historical productivity changes over the longest available time frame, absent any robust reason to do otherwise. This will mitigate the risk of placing undue weight on productivity changes realised in a particular year or by a particular DNSP, which would exacerbate the risk of productivity forecasting error.

Our analysis shows that many of the DNSPs that are operating efficiently have exhibited measured reductions in their opex productivity over the 2006 to 2016 period. However, since persistent declines in productivity would not be expected to occur in a workably competitive market, in our opinion it is more appropriate to apply a zero productivity growth rate assumption, consistent with previous decisions by the AER. For completeness we note this conclusion is based on publicly available evidence at the time of preparing this report, and that the AER's benchmarking results may change, including in light of its review of operating environment factors.

1. Introduction

This report has been prepared at the request of the Victorian and South Australian distribution network service providers (DNSPs), ie, Jemena, AusNet, SA Power Networks, CitiPower, Powercor and United Energy. Its purpose is to advise on the conceptual and empirical basis for the application of a pre-emptive productivity adjustment to a distribution network service business's (DNSP's) operating expenditure (opex), having regard to the operation of the regulatory framework and the Australian Energy Regulator's (AER's) approach to administering that framework.

The Australian Energy Regulator's (AER's) approach to determining the level of operating expenditure required by a DNSP, consistent with the requirements of the national electricity rules (the rules), involves escalating projected operating expenditure in each year of a regulatory control period to account for the effect of expected changes in output, real prices and productivity in that year ('the rate of change').

The conceptual framework applied by the AER acts such that:[1]

> …the forecast productivity change included in the rate of change should only represent the forecast shift in the productivity frontier.

The remainder of our report is structured as follows:

- in section 2, we briefly summarise the framework applied by the AER to account for opex productivity gains in assessing a DNSPs opex allowance;
- in section 3, we evaluate the extent to which the AER's approach to forecasting productivity growth reflects the net effect of opex productivity enhancing activities, consistent with its framework;
- in section 4, we consider the extent to which observed historical changes in opex productivity are likely to reflect DNSP's catching up to the productivity frontier, as compared with shifts in the productivity frontier;
- in section 5, we consider the appropriate evaluation period over which historical changes in opex productivity should be assessed; and
- in section 6, we provide our opinion on the appropriate forecast productivity growth rate to be applied by the AER in light of the available evidence.

In Appendix A1 we provide a more detailed summary of the regulatory framework and the AER's approach to administering that framework.

[1] AER, *Explanatory Statement – Expenditure Forecast Assessment Guideline*, November 2013, p.66.

2. AER framework

In economic regulation, a pre-emptive opex productivity adjustment accounts for the effect on opex of improvements in productivity that a DNSP would be expected to achieve as part of the ongoing efficient operation of its business.

In this section we explain the relationship between the workably competitive market paradigm and productivity improvements, describe the AER's approach to administering the regulatory framework, as it relates to opex productivity, and highlight the resulting implications for forecasting productivity growth.

2.1 Productivity and the workably competitive market paradigm

When drafting the initial chapter 6A rules for electricity transmission network service providers (TNSPs), on which the chapter 6 rules for DNSPs are based, the AEMC highlighted that:[2]

> The role of incentives in regulation can be traced to the fundamental objective of regulation. That is, to reproduce, to the extent possible, the production and pricing outcomes that would occur in a workably competitive market in circumstances where the development of a competitive market is not economically feasible.

In a workably competitive market, the achievement of productivity gains that are available throughout the industry will lead to efficient firms deriving normal returns. Put another way, shifts in the productivity frontier will not affect the profitability of firms operating efficiently.

This is because the cost efficiencies arising from industry-wide productivity can be expected to be achieved by all businesses operating efficiently and, by means of the competitive process, reflected in market prices. On the other hand, exceeding or falling short of such productivity improvements will lead to greater or lesser than normal returns, respectively.

The AER's approach to addressing productivity is intended to be consistent with this workably competitive market paradigm, ie, it explains that:[3]

> Forecast opex must reflect the efficient costs of a prudent firm. To do this it must reflect the productivity improvements it is reasonable to expect a prudent NSP can achieve. This is consistent with the productivity improvements an efficient firm operating in a competitive market would be able to retain. All else equal, a price taker in a competitive market will maintain constant profits if it matches the industry average productivity improvements reflected in the market price. If it is able to make further productivity improvements, it will be able to increase its profits until the rest of the industry catches up, and this is reflected in the market price.

We explain below the AER's approach to administering the regulatory framework, as it relates to productivity changes, in light of the workably competitive market paradigm.

2.2 AER's approach to operating expenditure

There are three, key interrelated elements of the AER's approach to administering the regulatory framework, as it relates to changes in opex productivity. These are:

- the base, step, trend framework for determining the future opex allowance;
- the efficiency benefit sharing scheme (EBSS); and

[2] AEMC, *Rule Determination – National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006, p.93.

[3] AER, *Expenditure forecast assessment guidelines for electricity distribution*, November 2013, p.65 and 66.

- the capital expenditure sharing scheme (CESS).

We comment on these approaches below and present a more comprehensive description in Appendix A.1.

2.2.1 Evaluating the opex allowance

The AER's base, step, trend approach involves estimating the efficient level of opex in the penultimate year of the current regulatory control period and then applying a 'rate of change' to assess the efficient level of opex in each year of the forthcoming regulatory control period.

The annual 'rate of change' is intended to reflect the effect on opex of changes in output, the price of inputs and productivity. The resultant level of opex in each year is a DNSP's opex allowance, subject to any approved step-changes and/or other opex.[4]

The subject of this report is the determination of the 'productivity growth' component of the 'rate of change'. Consistent with the workably competitive market paradigm, the AER explains that:[5]

> …the forecast productivity change included in the rate of change should only represent the forecast shift in the productivity frontier.

Importantly, the AER provides no explicit allowance for the cost of any productivity-enhancing measures required to achieve the AER's determination of forecast productivity change, other than to the extent its capex allowance reflects expenditure that might assist productivity growth.

Further, we note that DNSPs' opex allowances account only for certain step increases in expenditure, ie, those arising from regulatory changes and opex/capex trade-offs, and so in certain circumstances a DNSP may be adversely affected by the cost of both omitted step changes and inappropriately high pre-emptive productivity adjustments.

2.2.2 Incentive schemes

The annual opex allowance (determined by application of the base, step, trend approach) is a foundational reference point for the application of the EBSS and CESS, where:

- the EBSS operates so as to share all marginal opex productivity gains and losses (relative to the opex allowance), as between shareholders and customers; and
- the CESS operates so as to share marginal capital expenditure (capex) productivity gains and losses, as between shareholders and customers.

Since the EBSS and CESS apply only to marginal productivity gains and losses, the AER:

- affords a DNSP no benefit for achieving the level of productivity change reflected in the 'rate of change'; and
- penalises a DNSP for any failure to achieve that level of productivity change, where the cost of that failure is shared with customers.

As for costs required to achieve its forecast of productivity growth, the AER provides no explicit expenditure allowance for programs directed at achieving productivity improvements. In the AER's view, these efficiency enhancing measures are self-funding since the EBSS and CESS permit a DNSP to retain a share of any net efficiency gain and to share with customers the cost of any failure to realise marginal productivity gains.

[4] The AER may add or subtract step changes for any costs not captured in base opex or other opex required to forecast the level of opex that meets the opex criteria.

[5] AER, *Explanatory Statement – Expenditure Forecast Assessment Guideline*, November 2013, p.66.

2.3 Implications for forecasting 'productivity growth'

We explain in section 2.2 that:

- a DNSP must bear (in part) the cost of any failure to achieve the AER's forecast of productivity growth, but receives no benefit from achieving that productivity improvement; and
- in contrast, it is afforded a share of the net benefit of any further, marginal productivity gains.

Put simply, the AER uses a negative incentive ('a stick') and a positive incentive ('a carrot') to incentivise the achievement, respectively of:

- its forecast productivity growth; and
- of further productivity improvements.

Since the AER provides no explicit opex allowance for productivity-enhancing measures and affords a DNSP no share of the resultant benefit, any pre-emptive productivity adjustment must reflect the anticipated *net effect* of productivity enhancing activities. In other words, a pre-emptive productivity adjustment must reflect the change in opex productivity after accounting for all expenditure – both of a capital and operating nature – required to achieve those gains.

To do otherwise would not provide a DNSP with a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return, so would not comply with the revenue and pricing principles and the workably competitive market paradigm. By way of example, if the AER's forecast of 'productivity growth' overlooked the existence of capital costs required to achieve those gains, then a DNSP may be prevented from recovering its efficient costs and would derive a lower than normal return.[6]

Against this backdrop, including the absence of any explicit capex allowance to finance productivity-enhancing measures, setting a pre-emptive productivity adjustment at the lower end of expectations as to the productivity gains that could be achieved by DNSP operating efficiently will mitigate the risk that it is not afforded a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

[6] We note that the DNSP would not incur the full cost of those overlooked capital costs by means of the CESS but, nevertheless, would still be prevented from recovering the full extent of its efficient costs.

3. Net-effect of productivity changes

We explain in section 2.3 that the AER's framework operates such that a DNSP will only be provided with a reasonable opportunity to recover at least its efficient costs if any pre-emptive productivity adjustment reflects the anticipated *net effect* of opex productivity-enhancing activities. In other words, a pre-emptive productivity adjustment must reflect the anticipated change in opex productivity after accounting for all expenditure – both of a capital and operating nature – and associated incentive scheme effects required to achieve those gains.

In this section we consider the extent to which capital investment was required to achieve historical opex productivity improvements and the implications for the AER's approach to forecasting opex productivity changes.

3.1 Interrelationship between operating and capital expenditure

The implementation of activities directed at enhancing opex productivity generally require up-front program expenditure, with cost efficiencies being achieved over the longer term. These up-front costs can comprise expenditure that is both of an operating and/or capital nature.

Consistent with this observation, our review of historical opex productivity drivers identified that historical productivity gains have often necessitated up-front capital investments by DNSPs.

By way of example, AusNet achieved operational efficiencies by investing in a single enterprise asset management and enterprise resource planning system, but which necessitated a 'capital intensive period' of expenditure. By way of context, AusNet incurred annual information and communication technology (ICT) capex of approximately $50 million per annum over the 2010 to 2013 period.[7]

In further examples:

- over the 2009 to 2014 period, Evoenergy identified opex productivity improvements from capital investment in new information technology (IT) systems for billing, asset management and operations;
- over the 2010 to 2015 period, Ergon Energy improved the productivity of field staff and vegetation management by means of capital investments in field force automation and innovative new technologies, respectively;
- over the 2011 to 2015 period, Jemena realised opex productivity improvements from capital investment in new accounting systems; and
- over the 2012 to 2017 period, TasNetworks realised operational efficiencies by means of capital investment in new technologies for network operations.

Unless the capital costs incurred in the realisation of such operational efficiencies are taken into account, observations as to the rate of opex changes alone are likely to overstate the net effect of opex productivity growth.

Further, the existence of omitted capital expenditure requirements may incorrectly identify the existence of opex productivity gains where, in fact, there are none. By way of example, a change in Ausgrid's capitalisation policy reduced its reported opex over the 2004 to 2009 period, but those opex cost 'savings' would have been allocated to higher capex. Taken in isolation, the observed effect on reported opex would overstate the extent of historical productivity gains or underestimate the extent of productivity losses.

[7] AusNet, *Regulatory proposal 2016-20,* April 2015, p 133.

On the other hand, in some circumstances reductions in opex productivity (higher opex) may arise from pursuing capex productivity gains. By way of example, Ergon highlighted that the higher level of risk arising from the AER's proposed reduction in its capex allowance for asset replacements over the 2015 to 2020 would require $10 million of additional opex:[8]

> ….to facilitate higher levels of asset inspection and maintenance

Implications for forecasting productivity change

Our review of historical productivity drivers identified that, in many circumstances, historical opex productivity gains necessitated additional capital investment, such as in new systems or technologies. The operation of the CESS would have shared the cost of this additional capex between the DNSP and its customers.

Nevertheless, unless the capital costs incurred in the pursuance of opex productivity improvements, either in whole or part, are taken into account, the observed change in opex will overstate the net effect of any opex productivity enhancing activities. The consequence is that a DNSP would not be afforded a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

For these reasons, we consider below the extent to which the AER's approach to forecasting productivity change is likely to reflect the net effect of opex productivity.

3.2 The AER's approach to forecasting productivity

The AER explains that it will forecast future shifts in the productivity frontier:[9]

> …using the PFP [partial factor productivity] change of the most efficient business (or highly efficient businesses as a group) to gauge the scope of further productivity that may be achieved by individual businesses—this assumes that relevant drivers (such as technical change and scale change) and their impact remain the same over the two periods considered (historical versus forecast).

Opex multilateral partial factor productivity (MPFP) measures the relationship between total output and opex. We briefly describe the approaches applied previously by the AER to forecast productivity growth in Box 1.

Box 1: Forecast productivity growth in recent AER determinations

The AER relied on an econometric cost function model to produce opex productivity growth forecast for each of the NSW and ACT DNSPs in its 2015 determinations.[10]

The SFA model indicated forecast average annual opex MPFP growth rates would be negative over the 2014 to 2019 period.[11] However, the AER determined a zero opex productivity growth forecast on the basis of:[12]

> …economic benchmarking analysis, the drivers of recent productivity trends for the distribution businesses and the productivity forecasts for the gas distribution and electricity transmission sectors.

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[8] Ergon Energy, Forecast Expenditure Summary – System Operational Expenditure 2015 to 2020, p.30.

[9] AER, *Explanatory Statement – Expenditure Forecast Assessment Guideline*, November 2013, p 70.

[10] Economic Insights, *Economic benchmarking assessment of operating expenditure for NSW and ACT electricity DNSPs,* November 2014, pp 38 – 42.

[11] Economic Insights, *Economic benchmarking assessment of operating expenditure for NSW and ACT electricity DNSPs,* November 2014, p.41.

[12] AER, Final Decision –Ausgrid distribution determination 2015−16 to 2018−19 – Attachment 7 – Operating expenditure, April 2015, p.7-29.

In subsequent distribution determinations the AER referenced the SFA undertaken for the NSW and ACT DNSP's, but it has not explicitly forecast productivity growth rates for individual DNSPs using an SFA model since those 2015 determinations.

In its more recent distribution determination for TasNetworks, the AER based its zero productivity growth rate forecast on observed historical changes in productivity and its expectations as to 'the benchmark productivity that can be achieved for the forecast period'. In particular, the AER noted:[13]

- the general decline in opex productivity in the industry over 2006 to 2012 had levelled off and in some cases improved;
- TasNetworks' productivity declined between 2006 and 2010 but had since improved slightly;
- economic Insights' recommendation to apply a zero rate in previous determinations, which was based on assessed trends in annual output growth and input quantity at an industry level; and
- measured positive productivity in the electricity transmission and gas distribution sectors over the 2006-2014 period, which it forecasts will continue – the AER notes these sectors share common drivers of productivity with the distribution sectors, eg, input prices, regulatory obligations and demand.

Since MPFP reflects the relationship between total output and one particular input, when considered in isolation, it will provide a biased indicator of productivity change whenever some form of change in the mix of capex and opex inputs has the potential to affect productivity.

3.3 Implications for forecasting productivity growth

It is well-accepted that a firm's productivity will be affected by the relationship between opex and capex. Further, we explain in section 3.1 that observed historical opex productivity changes have in many circumstances necessitated additional capital investment.

Since opex MPFP does not reflect the extent of capex associated with the relevant efficiency enhancing activities, measured MPFP will overstate whole of firm productivity gains or, alternatively, understate any observed losses in productivity. It follows that forecasting productivity growth rates by reference to historical changes in opex MPFP is unlikely to afford a DNSP a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

A pre-emptive productivity adjustment should therefore be set at the lower end of the spectrum of expected productivity growth, to mitigate the risk that the AER does not afford a DNSP a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

[13] AER, *Draft Decision – TasNetworks distribution determination 2017−18 to 2018−19 – Attachment 7 – Operating expenditure*, September 2016, p.7-16

4. Risk of conflating catch-up and frontier shift

The AER explains that:[14]

> …the forecast productivity change included in the rate of change should only represent the forecast shift in the productivity frontier.

Importantly, observed historical changes in productivity will overstate historical shifts in the productivity frontier to the extent those observations reflect DNSPs (operating less efficiently) 'catching up' to the frontier.

Specifically, having regard to observed changes that reflect both 'catch-up' and 'frontier shift' may overestimate expected shifts in the productivity frontier and preclude DNSPs from a reasonable opportunity to recover at least their efficiently incurred costs and derive a normal return. Reflecting this, the AER correctly proposed that:[15]

> If there is a wide spread and more even distribution of efficiency levels then the effects of catch-up could be excluded by limiting the sample for the estimation of the opex cost function to the relatively efficient NSPs.

In this section we consider the extent to which observed historical changes in opex productivity are likely to reflect DNSPs catching up to the frontier.

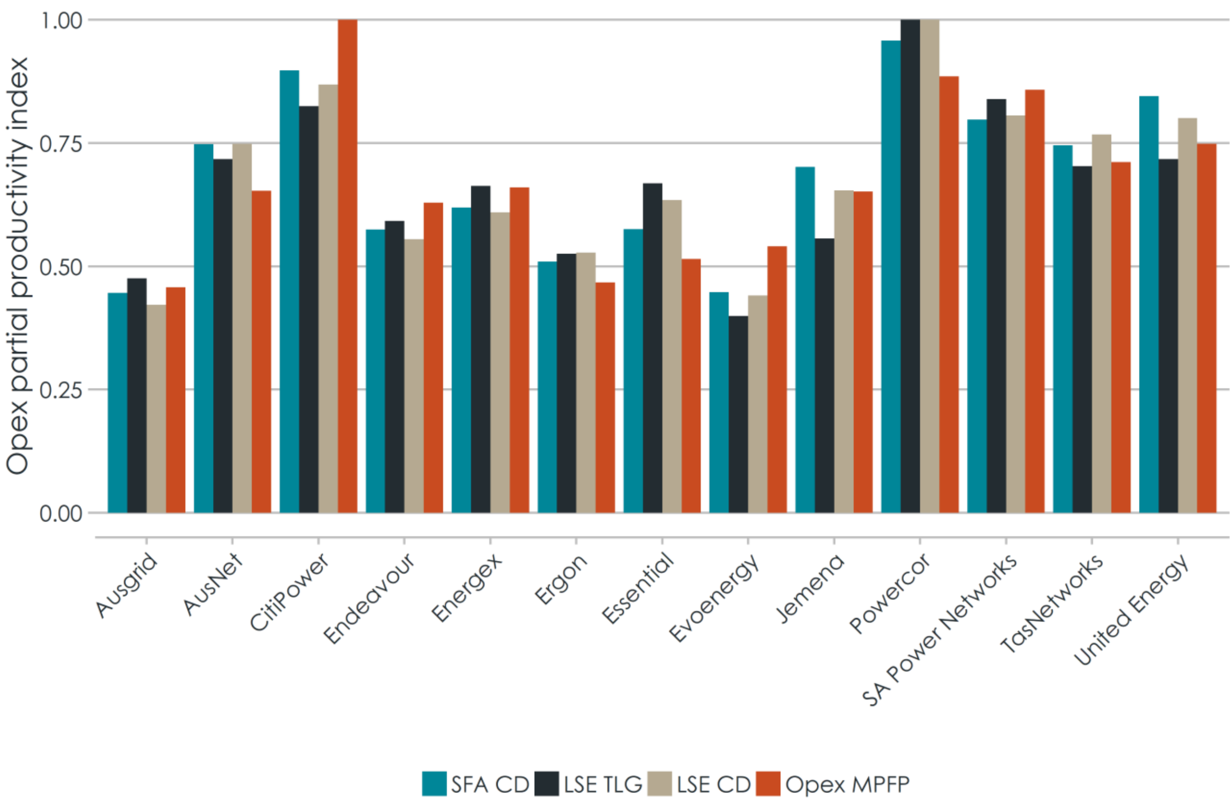
4.1 Evidence from the distribution sector

The average opex efficiency scores for the 2006 to 2016 period from the AER's 2017 benchmarking report illustrate a wide spread in relative opex productivity across DNSPs, as illustrated in Figure 1 below.

[14] AER, *Explanatory Statement – Expenditure Forecast Assessment Guideline*, November 2013, p.66.

[15] AER, *Explanatory Statement – Expenditure Forecast Assessment Guideline*, November 2013, p.90.

Figure 1 – Average opex efficiency scores (2006 to 2016)



Source: HoustonKemp analysis of Economic Insights DNSP opex efficiency scores data.

Our review of historical productivity drivers supports the observed wide range in relative opex productivity across DNSPs. In particular, a number of DNSPs identified drivers of productivity that do not represent shifts in the productivity frontier but, rather, reflect departures from previous, less efficient practices, ie, less efficient DNSPs ‘catching up’ the frontier.

By way of example, Ergon Energy identified opex productivity improvements resulting from changing its approach to property asset management, ie, because its former:[16]

> Non-strategic approach to property management has resulted in fragmented property assets resulting in… low workplace efficiencies at major regional locations.

Perhaps the most notable example of DNSPs catching-up to the frontier relates to the recent restructuring programs implemented by DNSPs in NSW and the ACT.

The NSW DNSPs implemented significant restructuring programs directed at reducing the level of full-time equivalent (FTE) staff. Consequently, Ausgrid, Endeavour Energy and Essential Energy reduced the level of FTE staff level by approximately 2,000, 1,500 and 1,000, respectively, over the 2012 to 2016 period.

Similarly, Evoenergy implemented a restructuring program that reduced the level of FTE staff by approximately 20 per cent by 2016.[17]

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[16] Ergon Energy, Revised regulatory proposal to the AER – Distribution Services for 1 July 2010 to 30 June 2015, p.129.

[17] AER, *Annual benchmarking report – electricity distribution network service providers*, November 2017, p 49.

We note that the existence of redundancy payments at the time of downsizing will act to understate the effect of those restructuring programs on opex productivity in short term, eg, the reduction in redundancy payments by Evoenergy in 2016 coincided with an 86 per cent improvement in opex productivity in that year.[18]

Nevertheless, it is clear from the scale of the restructuring undertaken by these DNSPS that any resulting historical or expected future improvements in opex productivity represent a catching up to the frontier, rather than a shift in the productivity frontier. A DNSP operating efficiently would not be able to achieve a reduction in opex of this magnitude and maintain its service levels, absent some innovation that significantly reduced the FTE staff requirements of all DNSPs.

Indeed, the AER notes that its 2015 final determinations to reduce these DNSPs' opex allowance was a driver of these productivity changes.

4.2 Implications for forecasting productivity growth

The available evidence strongly suggests that there existed a wide spread in the relative efficiency of DNSPs over the 2006 to 2016 period, and so some DNSPs are likely to have been catching up to the productivity frontier. It follows that, having regard to observed historical changes in productivity for DNSPs operating less efficiently will unnecessarily exacerbate the risk of conflating 'catch-up' and 'frontier shift' and so increase the risk of:

- overestimating the productivity change that could be achieved by DNSPs operating efficiently (frontier shift); and
- not affording DNSPs a reasonable opportunity to recover at least their efficiently incurred costs and derive a normal return.

For these reasons, regard should be given only to those DNSPs operating most efficiently when forecasting productivity change by reference to observed historical changes in productivity.

One approach to establishing this distinction is by reference to the 0.75 opex efficiency score threshold used in the past by the AER. The adoption of this threshold suggests there are six candidate DNSPs operating efficiently over the 2006 to 2016 period. The observed historical changes in productivity for these DNSPs could be used to form expectations as to future changes in productivity, while reducing the risk of conflating catch-up and frontier shift.

The existence of six candidate DNSPs for which data is available over a ten year period suggests that any adverse statistical implications of limiting the sample size is unlikely to be material and, in any case, would be outweighed by the potential consequences of otherwise conflating catch-up and frontier shift.

We present the OPFP scores for these DNSPs in Figure 2 below, with fitted trend lines that are statistically significant at the five per cent level.

[18] AER, *Annual benchmarking report – electricity distribution network service providers*, November 2017, p 54.

Figure 2 – Opex MPFP results for DNSPs with average opex efficiency scores above 0.75 (2006 to 2016)

Source: HoustonKemp analysis of AER, Annual benchmarking report – electricity distribution network service providers, November 2017, p 37. Note: we undertake the regression analysis using the regression-based trend method as per Economic Insights, Memo on transmission multilateral total factor productivity results, April 2016, p 5.

The decreasing trendlines for each of the DNSPs shown in Figure 2, except for TasNetworks, show that DNSPs operating efficiently have experienced reductions in their level of opex productivity over the 2006 to 2016 period. In other words, the average productivity growth for each of these DNSPs with a decreasing trendline has been negative over the longest period of measurement.

In section 5 we consider whether there may be any basis for evaluating these observed historical changes in productivity over a shorter period.

5. Evaluation period

In this section we consider the appropriate evaluation period over which historical changes in opex productivity should be assessed, having regard to the inherent uncertainty as to future innovations and shifts in the productivity frontier.

5.1 Innovation and productivity

Shifts in the productivity frontier are driven by innovation, ie: [19]

> …the process of introducing new or significantly improved goods or services and/or implementing new or significantly improved processes.

By their nature, innovations are difficult to predict, because there exists general uncertainty as to:

- the nature or form of future innovations;
- the rate at which future innovations will be adopted or implemented by DNSPs; and
- the effect of future innovations on a DNSP's expenditure requirements.

As to the nature or form of future innovations, proactive efforts to develop new business practices or explore new ideas in particular areas are not guaranteed of success, and future innovations may arise simply from an alertness to opportunities and a willingness to investigate new ideas.

Further, the pursuance and adoption of innovations involves a degree of risk, should the intended gains not come to fruition. As the Reserve Bank of Australia governor, Philip Lowe, notes:[20]

> …if we are to improve efficiency and advance technology then innovation is required and innovation requires someone to take a risk – the risk of trying a different process, the risk of changing workplace organisation and management practices, or the risk of spending scarce resources to explore a new idea. Sometimes the effort will not pay off, but just occasionally it will, and when it does, we find a better process, a more efficient organisational design or an idea that transforms how we do things.

This is one reason why the adoption of potential productivity-enhancing activities will vary across DNSPs, depending on their appetite for bearing risk, eg, TasNetworks notes that:[21]

> Unproven technology on TasNetwork may fail, or cause project delay [and] There is a risk that the technology won't be accepted by the business.

Further, even if the nature and rate of adoption of a particular innovation was known in advance, its effect on opex productivity would still be difficult to predict, ie, since it would depend on the particular circumstances of each DNSP. By way of example, the new technologies deployed by Ergon and Essential Energy to improve the productivity of vegetation management activities – Essential deployed a plane-mounted LiDAR system to identify high risk areas – would be unlikely to result in a similar level of productivity gains for urban networks.

It follows that there is always significant uncertainty as to the nature, rate of adoption and effect on opex of future innovations, ie, opex productivity. It is for these reasons that shifts in the productivity frontier – driven by innovations – are inherently difficult to predict.

[19] ABS, Innovation in Australian Business, 2003.

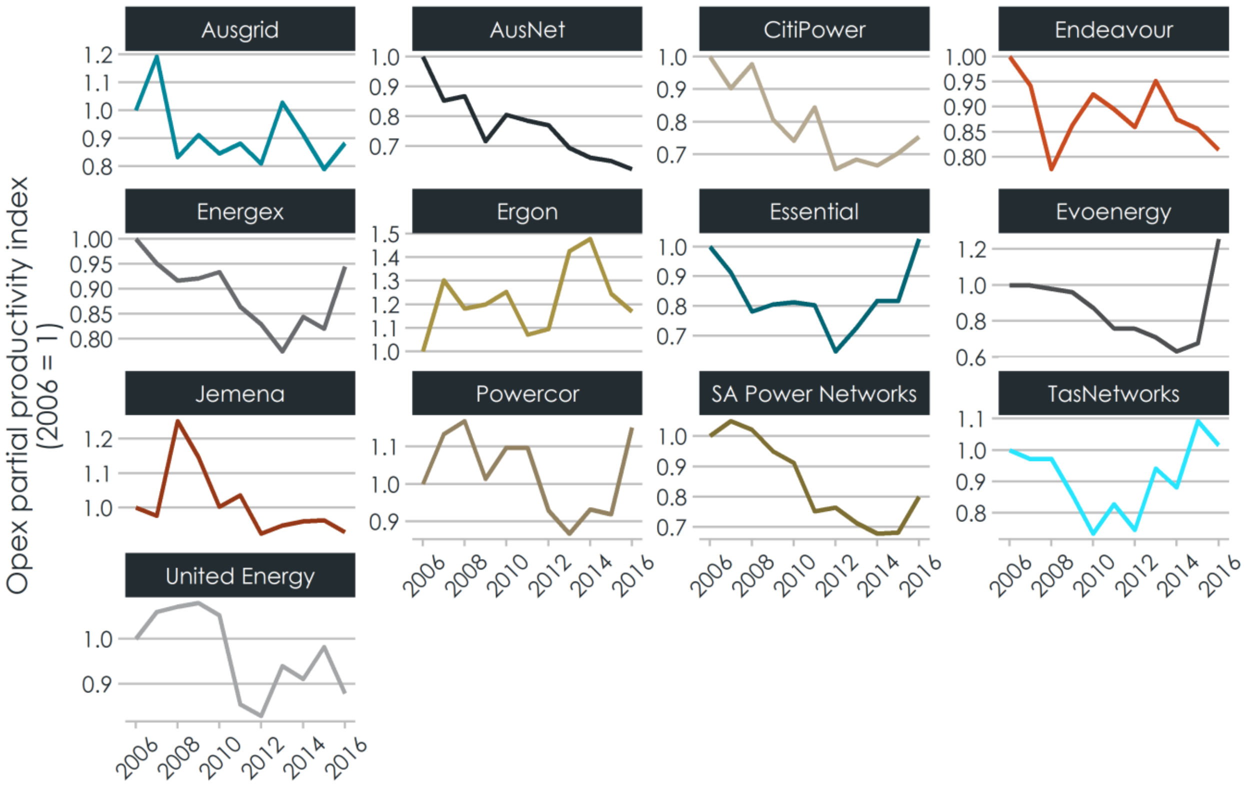
[20] Lowe P., *Speech to the Sydney Institute – Demographics, Productivity and Innovation*, 12 March 2014.

[21] TasNetworks, Network Innovation, December 2015, p.9.

The volatility in each DNSP's opex productivity from year to year over the last decade well-illustrates the inherent difficulty in forecasting productivity and the potential risks of placing emphasis on observations from a particular period.

To illustrate each DNSP's relative change in productivity from year to year we have standardised each DNSP's OPFP score from the AER's 2017 benchmarking report to a value of one in 2006 and illustrate the resulting year to year changes over 2006 to 2016 in Figure 3 below. This shows in the trends in opex productivity for individual DNSPs and highlights that each of these network businesses exhibit a high degree of volatility in measured productivity over time.

Figure 3 – The AER's opex partial factor productivity results, standardised scale (2006 to 2016) [22]



Source: AER, Annual benchmarking report – electricity distribution network service providers, November 2017, p 37.

Nevertheless, some information can be gleaned from historical shifts in the productivity frontier, ie, the AER:[23]

> …generally consider[s] past performance to be a good indicator of future performance under a business-as-usual situation.

However, the diversity and volatility of historical productivity changes illustrated in Figure 3 and uncertainty as to future drivers of productivity underlines the importance of a conservative approach to forecasting future productivity growth, ie, consideration of the longest possible measurement period to reduce the risk that short term volatility in productivity is not mistaken to be representative of long term trends in productivity.

[22] AER, *Annual benchmarking report – electricity distribution network service providers*, November 2017, p 37.

[23] AER, Draft Decision – TasNetworks distribution determination 2017−18 to 2018−19 – Attachment 7 – Operating expenditure, September 2016, p.7-15.

In the remainder of this section we discuss a range of important considerations when forecasting shifts in the productivity frontier by reference to observed historical productivity changes, having regard to the framework in which the AER will apply that forecast.

5.2 Review of past drivers of productivity

We conclude in section 4 that regard should be had only to observed historical productivity changes realised by those DNSPs taken to be operating most efficiently, so as to reduce the risk of conflating catch up and frontier shift. In this section we draw inferences as to the appropriate timeframe over which observed changes in productivity should be evaluated.

Our guiding principle is that, to the extent drivers of productivity change through time vary across DNSPs as at point in time, regard should be had to the longest available timeframe. In these circumstances, having regard to the longest available timeframe will mitigate the risk of forecasting bias resulting from the placement of undue weight on productivity changes realised in a particular year or by a particular DNSP.

5.3 Drivers of historical productivity changes

A detailed review of historical drivers of opex productivity showed that the drivers of productivity:

- are dynamic, ie, not consistent through time; and
- vary from DNSP to DNSP at any point in time.

Our review identified some key themes in the productivity improvements achieved by DNSPs, eg, a number of DNSPs achieved productivity improvements in relation to expenditure on call centres. However, the drivers of those productivity improvements varied considerably across DNSPs, eg:

- over the 2011 to 2015 period, AusNet achieved productivity gains by outsourcing and off-shoring some call centre roles;
- in 2015, Jemena reduced opex on call centres by introducing a short message service (SMS) power outage system; and
- in 2014 and 2016, Energex realised productivity gains from cross-skilling and then reducing the number of call centre staff.

Similarly, a number of DNSPs identified productivity improvements in relation to their billing function, but the nature and timing of the drivers varied across DNSPs, eg:

- over the 2006 to 2009 period, Jemena improved productivity by outsourcing its billing functions; and
- over the 2009 to 2014 period, Evoenergy realised productivity gains by investing in new billing systems.

These circumstances illustrate well the diversity in the drivers of opex productivity improvements through time and across DNSPs.

Further, even in circumstances where a common driver of productivity was identified, DNSPs took advantage of that driver at different times. By way of example, a number of DNSPs identified gains resulting from more sophisticated approaches to contract negotiations, but at different times, eg:

- as far back as the 2009 to 2014 period, Endeavour Energy reduced vegetation management costs through improved negotiation practices;
- over the 2011 to 2015 period, AusNet improved productivity by hiring specialist contract negotiators; and
- in 2016, SAPN reduced its insurance costs through improved contract negotiations; and
- over the 2015 to 2020 period, Ergon expects to realise similar gains from improved negotiating practices.

In summary, our review identified an absence of persistent drivers of productivity being leveraged by DNSPs through time, ie, drivers of productivity are ever changing. Further, we observed considerable diversity in the drivers of productivity between DNSPs at any point in time.

5.3.1 Implications for forecasting productivity change

Against a backdrop of dynamic and diverse drivers of opex productivity, regard should be had to observed historical productivity changes over the longest available time frame, absent any robust reason to do otherwise – the criteria for which we discuss in the following section.

To do otherwise would risk placing undue weight on productivity changes realised in a particular year or by a particular DNSP, thereby exacerbating the risk of forecasting error and of not affording a DNSP a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

This conclusion is consistent with the approach taken to estimate total factor productivity (TFP) in the United States and Canadian electricity distribution sector, for application as the 'X factor' in US price cap plans, for which very long term estimates of TFP are taken to be best practice. By way of example, a report commissioned by the Ontario Energy Board highlighted that:[24]

> In most regulatory proceedings where TFP trends have been estimated using indexing methods, long-run TFP trends have been estimated using about 10 years worth of historical data. The Board used a somewhat longer, 18 year period to measure industry TFP growth…
>
> …it is often not warranted to assume that TFP growth measured for short historical periods will be a good proxy for future trends. Shorter sample periods are more likely to be distorted by factors such as the timing of expenditures or unusual output growth. …a general rule of thumb in regulatory proceedings is that a minimum of 10 years of data are needed to calculate a generally reliable estimate of the industry's long-run TFP trend.

Similarly, a report for the Australian Energy Market Commission noted that:[25]

> Since TFP growth rates fluctuate yearly, it is preferable to use the longest historical time period possible to conduct the TFP study.

The practice of estimating the potential for future productivity gains by reference to a long historical time period was applied in a 2017 Massachusetts rate determination where the Massachusetts Department of Public Utilities accepted network businesses' use of a fifteen year time period to forecast future productivity changes. The Department of Public Utilities noted that using a shorter timeframe might reduce the statistical robustness of the study, stating that:[26]

> The Department is persuaded, however, that, in the instant case, the benefit of using more recent data from 2001 to 2015 to incorporate non-trivial industry changes (as discussed in greater detail below) outweighs possible sacrifices to the study's robustness inherent with the use of a shorter time period.

A further reason for taking a long-term view is that in many cases the net effect of productivity enhancing activities – the importance of which we discuss in 3 – can only be assessed over an extended horizon. In particular, the full benefit of efficiency enhancing activities may only be realised years into the future and may be preceded by a degradation of productivity in the short term. By way of example, a number of DNSPs

[24] Pacific Economics Group, *Defining, measuring and evaluating the performance of Ontario Electricity Networks: a concept paper – report to the Ontario Energy Board*, April 2011, p.49.

[25] Brattle Group, *Use of total factor productivity analyses in network regulation: case studies of regulatory practice,* October 2008, p 4.

[26] Department of Public Utilities, Massachusetts, *Order establishing Eversource's revenue requirement: DPU 17-05,* November 2017, p 384.

identified productivity improvements arising from the implementation of new IT systems (as discussed in section 3.1), but Ausgrid noted:[27]

> …the costs of training people to use new systems, the costs of securely managing the systems and ongoing licence and support fees. In the short term, IT costs are higher.
>
> …[T]he capability of staff will deteriorate in the short term until such time as they become acquainted with systems and the new capabilities. This is likely to be the case with field staff that may be utilising new on-line technologies for the first time.

Nevertheless, we discuss below the applicable criteria if any emphasis is to be placed on more contemporaneous observations, as compared with an analysis over the full period for which data is available.

5.4 Necessary conditions for limiting the evaluation period

In our opinion, it is only appropriate to place a balance of emphasis on more contemporaneous observations if there exists strong evidence:

1. that those observations do not reflect DNSPs catching up to the productivity frontier;
2. the drivers of those particular observed shifts in the productivity frontier are likely to persist into the future; and
3. those drivers will have a similar net effect on the future opex required by a DNSP operating efficiently, as compared with their observed historical net effect – the productivity gains are replicable.

Of particular relevance to these factors are recent observations by the AER as to the slightly positive trend in productivity since 2012.[28]

Importantly, many of the DNSPs that have achieved recent notable gains in productivity are those that have been operating less efficiently. In other words, these recent productivity gains reflect DNSPs catching up to the productivity frontier, rather than shifts in the productivity frontier. For example, we explain in section 4.1 that the productivity gains driven by the restructuring programs implemented by the NSW and ACT DNSPs reflect these DNSPs catching up to the productivity frontier, consistent with the AER's cuts to their opex allowances.

Having regard to the first criterion set out above and the analysis set out in section 4, it would be inappropriate to place any emphasis on recent gains achieved by DNSPs operating less efficiently.

The AER also noted that SAPN achieved opex productivity gains that were driven by more moderate weather conditions in the last two years. In our opinion, placing an emphasis on these observed gains would be inappropriate, having regard to the second principle set out above. In particular, it is not clear that the driver of these gains (weather conditions) will persist throughout the next regulatory control period and so be applicable either to SAPN or to DNSPs located in other regions. In fact, SAPN advises that its opex productivity is likely to be lower for the next benchmarking period, due to higher costs associated with a high incidence and severity of extreme weather events in the regulatory year.

Finally, even if more moderate conditions were expected across the NEM in the next regulatory control period, further analyses would be required to evaluate compliance with the third criterion set out above, ie, that there would be an equivalent effect on the future opex productivity of SAPN and other DNSPs.

[27] Ausgrid, *Revised Regulatory Proposal and Interim Submission,* January 2009, p.92-3.

[28] AER, *Annual benchmarking report – electricity distribution network service providers*, November 2017, p.48.

6. Conclusion

We explain in section 2 that the AER's approach to administering the regulatory framework has important implications for forecasting productivity growth, namely:

- that its forecast of productivity growth must reflect the *net effect* of opex productivity enhancing activities, ie, after accounting for all expenditure – both capital and operating in nature – required to achieve those gains; and
- that any upward bias in forecast productivity growth risks not affording a DNSP a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

Our analysis in section 3 identified that, in many circumstances, observed historical opex productivity gains necessitated additional capital investment. Since the opex MPFP analyses relied upon by the AER do not reflect capex required to achieve opex productivity gains, having regard to opex MPFP risks overstating productivity gains or, alternatively, understating any decline in productivity.

This consideration also points to a pre-emptive productivity adjustment being set at the lower end of the expected productivity growth outcomes, in order to mitigate the risk that a DNSP does not have a reasonable opportunity to recover at least its efficiently incurred costs and derive a normal return.

In section 4 we observe that a number of DNSPs have been operating below their efficiency potential over the 2006 to 2016 period and so that having regard to the productivity changes for these DNSPs will exacerbate the risk of conflating 'catch-up' and 'frontier shift'. As recognised by the AER, conflating 'catch-up' and 'frontier shift' will cause upwards bias in forecast productivity growth. To mitigate this risk and avoid the corresponding adverse consequences of an upwards bias, we conclude that productivity growth should be forecast by reference to a subset of DNSPs taken to be operating efficiently over the evaluation period.

Finally, in section 5 we highlight the inherent uncertainty as to the nature and scale of future shifts in the productivity frontier and illustrate the volatility in productivity from year-to-year. We also summarise our review of historical productivity drivers and observe that they change through time and differ across DNSPs at any point in time.

Against a backdrop of dynamic and diverse drivers of opex productivity, we explain that regard should be had to observed historical productivity changes over the longest available time frame, absent any robust reason to do otherwise. This will mitigate the risk of placing undue weight on productivity changes realised in a particular year or by a particular DNSP, which would exacerbate the risk of productivity forecasting error.

Nevertheless, for completeness we set out the applicable criteria if any emphasis is to be placed on more contemporaneous observations of productivity growth. On the basis of the evidence to hand, there is no apparent basis for forecasting productivity growth by reference to more recent, short term trends in productivity.

For these reasons, in our opinion the AER should forecast productivity growth:

- by reference to the observed productivity changes realised by DNSPs operating efficiently over the longest available timeframe; and
- by setting its forecast at the bottom end of expectations as to future productivity growth.

In light of this conclusion, in Figure 2 we presented the opex MPFP scores for DNSPs with opex efficiency scores above 0.75 over the 2006 to 2016 period, with fitted trend lines that are statistically significant at the five per cent level.

These statistically significant trends suggest that DNSPs operating efficiently have experienced a general decline in productivity over the 2006 to 2016 period, which suggests the application of a negative pre-emptive productivity adjustment.

However, since persistent declines in productivity would not be expected to occur in a workably competitive market, in our opinion it is more appropriate to apply a zero productivity growth rate assumption, consistent with previous decisions by the AER. For completeness we note this conclusion is based on publicly available evidence at the time of preparing this report, and that the AER's benchmarking results may change subject to its review of operating environment factors.

A1. Regulatory framework

In this appendix we expand on the information presented in section 2, ie, on the regulatory framework established by the rules and the AER's approach to administering that framework.

A1.1 The DNSP's proposed operating expenditure forecast

A DNSP's regulatory proposal must include a total forecast opex for the entire forthcoming regulatory control period and each regulatory year of that period, that the DNSP considers necessary to achieve each of the opex objectives. The opex objectives require a DNSP:[29]

1. to meet or manage the expected demand for standard control services over that period;
2. to comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;
3. to the extent that there is no applicable regulatory obligation or requirement, maintain to the relevant extent:
   i. the quality, reliability and security of supply of standard control services; and
   ii. the reliability and security of the distribution system through the supply of standard control services; and
4. to maintain the safety of the distribution system through the supply of standard control services.

A1.2 The framework for the AER's assessment of operating expenditure

The rules require the AER to accept a DNSP's total opex forecast if it is satisfied that the forecast reasonably reflects each of the opex criteria. The opex criteria are:[30]

1. the efficient costs of achieving the opex objectives;
2. the costs that a prudent operator would require to achieve the opex objectives; and
3. a realistic expectation of the demand forecast and cost inputs required to achieve the opex objectives.

The AER must reject a DNSP's total opex forecast if it is not satisfied that the forecast reasonably reflects all three of the opex criteria.[31] If the AER rejects the DNSP's opex forecast, it is required either to amend the forecast or to substitute its own forecast such that it is satisfied the alternative forecast reasonably reflects all three of the opex criteria, setting out the reasons for its decision.[32]

Factors that the AER must take into account

The AER's assessment of whether or not a DNSP's total opex forecast reflects the opex criteria requires it to exercise its regulatory discretion, the application of which is guided by the NEO.

In other words, the AER must ensure that its decision with respect to a DNSP's opex forecast will promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of electricity consumers.[33]

[29] NER, clause 6.5.6(a).

[30] NER, clause 6.5.6(c).

[31] NER, clause 6.5.6(d).

[32] NER, clause 6.12.1(4)(ii).

[33] NEL, section 7.

The AER must also have regard to the revenue and pricing principles set out in section 7A of the NEL. These principles require, amongst other things, that a DNSP be provided with a reasonable opportunity to recover at least the efficient costs it incurs in providing network services and complying with any regulatory obligation, requirement or payment.

In addition, the rules provide a list of factors (the opex factors) to which the AER must have regard in its assessment. The opex factors are:[34]

- the most recent annual benchmarking report that has been published by the AER, and benchmark opex that would be incurred by an efficient DNSP over the relevant regulatory control period;
- the actual and expected opex of the DNSP during any preceding regulatory control periods;
- the extent that the opex forecast includes expenditure to address the concerns of consumers as identified by the DNSP in the course of its community engagement;
- the relative prices of operating and capital inputs;
- the substitution possibilities between opex and capex;
- whether the opex forecast is consistent with any incentive schemes that apply to the DNSP;
- the extent that the opex forecast is referrable to arrangements with a person other than the DNSP that, in the opinion of the AER, do not reflect arm's length terms;
- whether the opex forecast includes an amount relating to a project that should more appropriately be included as a contingent project;
- the extent that the DNSP has considered and made provision for efficient and prudent non-network alternatives;
- any relevant project assessment conclusions report prepared as part of the RIT-D assessment of network augmentations; and
- any other factor the AER considers relevant and has notified the DNSP in writing, prior to the submission of its revised regulatory proposal, is an opex factor.

The rules do not prescribe any weighting that the AER should apply to each opex factor. The AER therefore has discretion with respect to how it considers each factor when assessing a DNSP's total opex forecast. The opex factors do not limit the information on which the AER can rely in assessing a DNSP's opex proposal and, if necessary, an appropriate substitute.[35]

When drafting the initial chapter 6A rules for TNSPs, on which the chapter 6 rules for DNSPs are based, the AEMC highlighted the role of the opex factors in reducing the risk of regulatory error associated with the regulator's information disadvantage.[36]

The AER is required to publish its proposed approach to determining the reasonableness of a DNSP's opex proposal in its *Expenditure Forecast Assessment Guidelines*.[37] The *Expenditure Forecast Assessment Guidelines* do not bind the AER or the DNSP. However, if the AER departs from the guideline in assessing the reasonableness of a DNSP's opex forecast, it is required to state the reasons for doing so in its regulatory determination.[38]

[34] NER, clause 6.5.6(e).

[35] AEMC, *Final rule determination - National electricity amendment (Economic regulation of Network Service Providers) Rule 2012*, November 2012, p.115.

[36] AEMC, *Final rule determination - National electricity amendment (Economic regulation of electricity transmission services) Rule 2006 No. 18*, November 2006, section 4.1.3, p.52.

[37] NER, clause 6.4.5(a).

[38] NER, clause 6.2.8(c).

A1.3 The AER's revealed cost base-step-trend approach

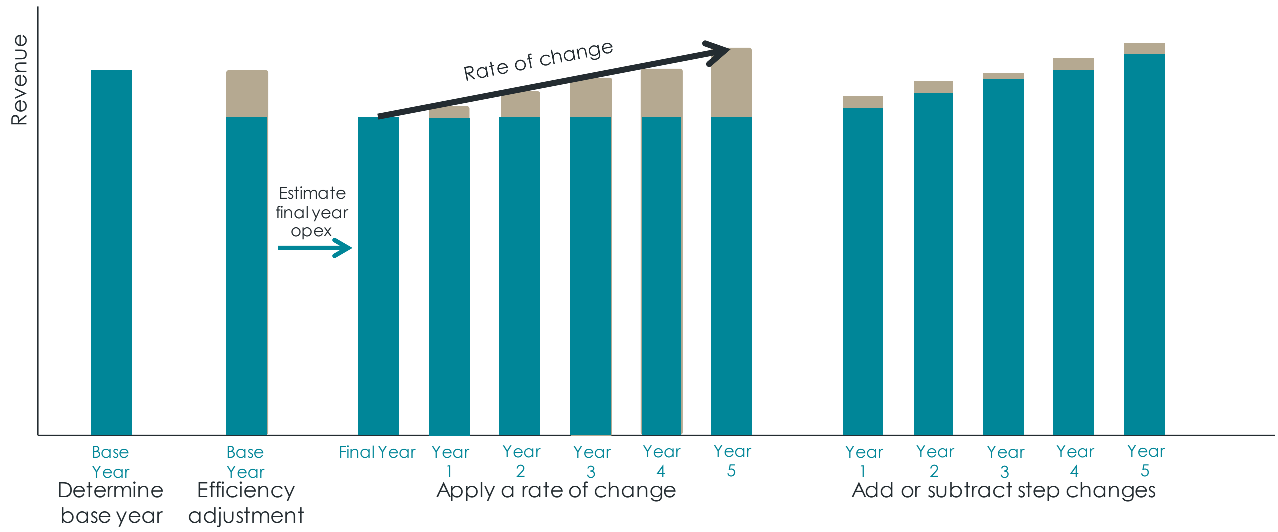
In the *Expenditure Forecast Assessment Guidelines* the AER proposed that it will take a 'base-step-trend' approach to assessing forecasts for most opex categories.[39] However, for some opex categories, the AER assess forecasts through other techniques, including benchmarking.[40]

In essence, the AER's revealed cost base step trend approach to assessing forecast opex involves:

- determining the efficient level of operating expenditure in a historical year (the base year);
- estimating opex in the final year of the current regulatory control period by reference to any adjustments to, or non-recurrent efficiency gains in, the base year;
- applying a 'rate of change' to estimated final year opex to assess opex over the forthcoming regulatory control period;
- adding or subtracting step changes for any costs not captured in base opex or the rate of change that are required to forecast the level of opex that meets the opex criteria; and
- making any adjustments for other opex at the completion of its base-step-trend assessment.

This process is illustrated in Figure 4 below and explained in more detail in the remainder of this section.

Figure 4 – The AER's revealed cost base step trend approach



The AER prefers a 'revealed cost' approach to assessing base opex, which is based on an assessment of actual opex in the current regulatory control period. The AER typically starts its assessment by selecting a base opex value equal to the actual opex in a recent year for which actual opex is known – the 'base year'.

If the actual expenditure in the base year reasonably reflects the opex criteria, the AER sets base opex equal to actual opex in the base year. However, if the AER is not satisfied that the actual opex in the base year reasonably reflects the opex criteria it will adjust it so that base year opex reflects an efficient, recurrent level of opex that reflects the opex criteria.

The AER uses a combination of techniques to assess whether base opex reasonably reflects the opex criteria. It is in this assessment of the efficiency of actual opex that the AER places importance on benchmarking. The AER uses benchmarking to look for material inefficiencies in a DNSP's base opex and, if

[39] AER, *Expenditure forecast assessment guidelines for electricity distribution*, November 2013, p.22.

[40] AER, *Expenditure forecast assessment guidelines for electricity distribution*, November 2013, section 4, p.22.

it determines that the DNSP is materially inefficient compared to its peers, may use benchmarking to adjust actual opex and set base opex.

The next step of the AER's base-step-trend approach (the application of a rate of change) requires an estimate of opex for the final year of the current regulatory control period, which is typically not known at the time of the regulatory determination. The AER estimates opex in the final year of the current regulatory control period as follows, ie:[41]

$$A_f^* = F_f - (F_b - A_b) + non\text{-}recurrent\ efficiency\ gain_b$$

where:

- A_f^* is the best estimate of actual opex in the final year of the current regulatory control period;
- F_f is the determined opex allowance for the final year of the current regulatory control period;
- F_b is the determined opex allowance for the base year;
- A_b is the amount of actual opex in the base year; and
- $non\text{-}recurrent\ efficiency\ gain_b$ is the non-recurrent efficiency gain in the base year.

Relevantly, this approach allows a DNSP to retain incremental efficiency gains achieved after the base year through the EBSS mechanism, which we explain in section 2.2.2. To the extent final year opex differs from the estimate produced by this method, incremental efficiency gains will be retained through the opex forecast.

The rate of change

The AER then uses the estimated final year opex (taking into account an efficiency adjustment, if required) to assess opex for the following regulatory control period by applying the rate of change for each year *t* of the regulatory control period equal to:[42]

$$rate\ of\ change_t = output\ growth_t + real\ price\ growth_t - productivity\ growth_t$$

where:

- $rate\ of\ change_t$ is the annual percentage rate of change in year *t*;
- $output\ growth_t$ is the forecast annual increase in output;
- $real\ price\ growth_t$ is the forecast annual increase in the real price of inputs; and
- $productivity\ growth_t$ is the forecast annual increase in productivity.

The measures of output used to forecast output growth should be the same as the measures used to *forecast real price growth and productivity growth.*

Step changes

The AER may add or subtract step changes for any costs not captured in base opex or the rate of change that are required to forecast the level of opex that meets the opex criteria. Step changes may be for cost drivers including new, changed or removed regulatory obligations or efficient capex/opex trade-offs. The AER will generally only include step changes if the efficient base year opex and the rate of change in opex do not already compensate for the proposed costs. In other words, step changes should not double count costs included in other elements of the expenditure forecast.[43]

[41] AER, *Expenditure forecast assessment guidelines for electricity distribution*, November 2013, p.23.

[42] AER, *Expenditure forecast assessment guidelines for electricity distribution*, November 2013, p.23.

[43] AER, *Expenditure forecast assessment guidelines for electricity distribution*, November 2013, p.24.

Other opex

If the AER considers further adjustments are required for forecast opex to meet the opex objectives, it may make adjustments for other opex at the completion of its base-step-trend assessment.

A1.4 Incentive mechanisms

DNSPs that provide standard control services at a cost lower than that determined by the AER are entitled to keep the resulting margin for a period of time. The extent to which gains or losses from underspending or overspending are shared between DNSPs and customers is generally determined by the efficiency benefit sharing scheme (EBSS) and the capital expenditure sharing scheme (CESS), which provide rewards (or impose penalties) for differences between allowed and outturn levels of opex and capex, respectively.

To complement the expenditure related incentive mechanisms, the AER also applies the service target performance incentive scheme (STPIS). The STPIS provides incentives to improve service quality by introducing a financial reward or penalty – by means of an increment or decrement to the DNSP's annual distribution revenue requirement – that reflects a DNSP's performance against specified service parameters.

We summarise the operation of these schemes below.

Efficiency benefit sharing scheme

The rules require the AER to develop and publish a scheme (the EBSS) that provides for a 'fair sharing' between the DNSP and network users of gains (losses) derived from the DNSP's operating expenditure if it is less (more) than the forecast opex accepted or substituted by the AER for a regulatory control period.[44]

The EBSS was designed to counteract the incentives that would otherwise exist for a DNSP operating under a revenue cap to make inefficient expenditure decisions directed at maximising its future revenue allowances. Absent an EBSS, reliance on outturn costs to guide the determination of a DNSP's future revenue allowance could create incentives for a DNSP to undertake strategic behaviour, say, by inflating its opex allowance in the base year or by delaying the implementation of efficiency enhancing measures.

The current form of the EBSS applies in conjunction with the 'no claw-back' principle and the revealed cost approach to forecasting opex and removes any such inconsistent incentives. The EBSS was designed such that:

- both temporary and permanent gains and losses arising from underspending and overspending relative to forecast opex are shared between DNSPs and customers; and
- the rate of retention of any gains or losses is invariant as to the timing within a regulatory period at which those gains/losses occurred.

These arrangements provide DNSPs with an increased share of the benefits of any gains – by delaying the sharing of these gains with customers – thereby increasing the incentive on the DNSP to make cost savings.

The EBSS operates to mitigate these incentives by providing DNSPs with an increased share of the benefits of any gains by delaying the sharing of these gains with customers; thereby increasing the DNSPs' incentives to make cost savings.

Capital expenditure sharing scheme

The AEMC's 2012 Economic Regulation Rule Change introduced a new requirement to the rules that states the AER may develop a CESS to provide DNSPs with an incentive to undertake efficient capex during a regulatory control period.

[44] The rules, clause 6.5.8.

The objective of the CESS is to provide DNSPs with stronger incentives to undertake efficient capex during a regulatory control period. It achieves this by rewarding DNSPs that outperform their capex allowance, and penalising DNSPs that spend more than their capex allowance. Similar to the EBSS, the CESS also provides a mechanism for sharing gains and losses from underspending and overspending between DNSPs and customers.

The CESS complements the EBSS by ensuring that a DNSP does not have a perverse incentive to distort its decision to undertake either capex or opex.[45]

Service target performance incentive scheme

The reliability standards set out in a DNSP's licence represent the minimum level of supply reliability that must be achieved. However, the regulatory framework also incentivises DNSPs to improve their reliability performance over and above this minimum in circumstances where the value of the additional reliability achieved outweighs the costs of achieving it. This is achieved by means of the STPIS.

In broad terms, the STPIS was designed to balance a DNSP's incentive to reduce expenditure with the need to maintain a certain level of service quality. At the same time the EBSS and CESS provide incentives to improve operating and capital efficiency, the STPIS ensures that any reduction in expenditure is not at the expense of an inefficient deterioration in service performance for customers.[46]

The STPIS achieves this by providing financial rewards to DNSPs that meet predetermined service standards and imposes financial penalties for DNSPs that fail to meet the targets. The value of the STPIS payments are capped at five per cent of DNSP's revenue allowance.[47]

[45] AER, *Better Regulation Capital Expenditure Incentive Guideline for Electricity Network Service Providers*, November 2013.

[46] AER, *Electricity distribution network service providers Service target performance incentive scheme*, November 2009, clause 6.3.2(a).

[47] AER, *Electricity distribution network service providers Service target performance incentive scheme*, November 2009, clause 2.5(a)

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